Tex-226-F, Indirect Tensile Strength Test

Overview

Effective date: August 1999 to October 2004

Use this procedure to determine the tensile strength of compacted bituminous mixtures.

Apparatus

The following apparatus is required:

- loading press capable of applying a compressive load at a controlled deformation rate of 51 mm (2 in.) per minute
- loading strips consisting of 13 x 13 mm (0.5 x 0.5 in.) square steel bars for 102 mm (4 in.) diameter specimens and 19 x 19 mm (0.75 x 0.75 in.) square steel bars for 152 mm (6 in.) diameter specimens. Machine the surface in contact with the specimen to the curvature of the test sample.

Specimen

The following specimens are needed:

- Laboratory Molded Specimen
  - prepared according to test methods "Tex-205-F, Laboratory Method of Mixing Bituminous Mixtures," and "Tex-206-F, Compacting Test Specimens of Bituminous Mixtures" with a diameter of 101 mm (4 in.) or 152 mm (6 in.) and a height of approximately 51 mm (2 in.)
- Core Specimen
  - with a diameter of 101 mm (4 in.) or 152 mm (6 in.) and core height of 38 mm to 51 mm (1.5 in. to 2 in.).

Test Record Forms

Use the following worksheet and Microsoft Excel program for completing worksheets and reporting purposes.

- 'Indirect Tensile Strength'
- 'Prediction of Moisture-Induced Damage to Bituminous Paving Mixtures Using Molded Specimens (Tex-531-C)' (531C-r2)

Procedure

Follow these steps to perform the indirect tensile strength test.

Indirect Tensile Strength Test	
Step	**Action**
1	Calibrate the loading press to utilize a deformation rate of 51 mm (2 in.) per minute.
2	Ensure the two loading strips remain parallel to each other during testing.
3	Determine the height and diameter of the test specimen.
4	Place the test specimen in the constant temperature apparatus long enough to ensure a consistent temperature of 25 ± 1 °C (77 ± 2 °F) throughout the test specimen.
5	Carefully place specimen on the lower loading strip.
6	Slowly lower top loading strip into light contact with the test specimen.
7	Apply the load at a controlled deformation rate of 51 mm (2 in.) per minute and determine the total vertical load at failure of the specimen.

Calculations

Use the following to determine tensile strength of compacted bituminous mixtures:

$$S_T = \frac{2F}{3.14x(hd)}$$

Where:

- S_T = Indirect tensile strength, Pa (psi)
- F = Total applied vertical load at failure, N (lb.)
- h = Height of specimen, in mm (in.)
- d = Diameter of specimen, mm (in.).

When soil press is used for testing:

$$F(lb) = P_f \times 16.35 \text{ or}$$
$$F(N) = P_f \times 72.73$$

Where:

- P_f = Pressure indicated by press gauge

NOTE: If tensile strength in kPa is desired, multiply S_T (Pa) by 1000.